83 SHA
2407
1898-99

2407

Diag. Cht. No. 5101-2

U. S. COAST AND GEODETIC SURVEY
LIBRARY AND ARCHIVES
NOV 11 1899
Acc. No. 51111

U. S. COAST AND GEODETIC SURVEY.

Henry S. Pritchett, Superintendent.

State: Cal.

DESCRIPTIVE REPORT.

Hydrographic Sheet No. 2407

LOCALITY:

Hydrography of part of San Diego Bay.

1898-99

CHIEF OF PARTY:

Ferdinand Westdahl, Ast

2407

NOV.-9. 99 18012

Descriptive Report to accompany hydrographic Sheet entitled

Treasury Department
U. S. Coast and Geodetic Survey
Henry S. Pritchett, Superintendent

Hydrography of part of
San Diego Bay
California

By the party in charge of Ferdinand Westdahl, Assistant C. & G. S.
Steamer "Fedney"
Began November 14, 1898
Ended February 23, 1899
Scale $\frac{1}{10,000}$

This is a resurvey made for the purpose of ascertaining the amount of change wrought by the jetty construction outside the mouth of the harbor upon the Guniga Shoal obstruction and the channel over the bar. The inner limit was originally intended to embrace the so called "Middle ground", but was later extended so as to include the water front of the city of San Diego. The lines of soundings have been run close purposely because my instructions called for results which should leave "no doubt as to the curves of equal depth". They may be too close in places, owing principally to the scheme of three crossings, which does not lend itself so readily to contraction or expansion, but was adopted because in the constantly curving channel one of the three

directions would be almost if not quite at right angles to its course.

The soundings are plotted to the nearest half foot in all depths smaller than sixty feet; in greater depths to the nearest foot. That is to say that, for instance, from 7.ft.3 to 7.ft.7 inclusive is called 7½ feet, and from 7.ft.8 to 8.ft.2 inclusive is put down as 8 ft. This was done in order to avoid other fractions, the figures of which would have to be made so small as to be almost illegible. The plane of reference being already established tides were observed only while sounding. A temporary tide-staff was set up near the end of the jetty outside the entrance and observations made upon it, in smooth weather, every 10 minutes for 25 hours simultaneously with the permanent gauge at the Quarantine Station wharf, La Playa. The two curves, reduced to the same zero, were plotted on division paper which is fastened in Vol. 1, Tide Observations at Quarantine Station. This was used in the following manner in reducing the soundings made outside the harbor. Each days tide-curve at La Playa was plotted on division paper and then another curve representing the simultaneous tidal conditions outside the entrance, as shown by the diagram, was drawn freehanded along the first in a broken line. The outside soundings were reduced in accordance with the latter curve. After the work had progressed as far as abreast of Channel Point, near San Diego, tides were observed on a gauge established at the Santa Fe wharf. Simultaneous observations were made here also for 25 hours

with the gauge at La Playa, and then discontinued on the latter gauge. In applying the rule given in Par. 85, Instructions for Hydrographic Parties, 1894, to the latter simultaneous observations, the difference between the zeros of the gauges was found to be 2.ft.45, or the plane of reference at the Quarantine Station, which read 4.ft.0 on the staff there, should read 6.ft.45 on the staff at the Santa Fe wharf. The difference between the low water readings of the same gauges is 2.ft.27 however, and as the mean of 32 lower low waters on the gauge at Santa Fe wharf was subsequently found to be 6.ft.0, and the reading of the old plane used here in 1878 (found by leveling from the Bench Mark) is 6.ft.06, I have adopted as a compromise plane of reference here the reading 6.ft.2, to which all the soundings above Channel Point have been reduced. This seemed reasonable to me as my instructions specifically stated that the plane of reference should be derived from the Bench Mark at La Playa.

The curves are drawn so as to include the outermost sounding of the given depth. In the area outside the harbor, where there was always more or less swell, and soundings recorded to the nearest foot only, curves strictly so drawn would appear too irregular. I have therefore drawn them as smoothly as possible between the outermost soundings of 18 feet, for instance, and thereby included many soundings of 18½ and even 19 feet within the 18 ft. curve. There are two reasons for the apparent irregularity of the curves on the flats to the Eastward and

southward of the jetty. One I believe to be that the bottom is irregular. Whenever the flats inside the harbor were exposed at the lowest spring tides they had a corrugated appearance and were pitted with holes of more than one foot in depth. It is reasonable to suppose that the submerged flats outside the bay are similarly constituted, except near the beach where the sand is beaten smooth by wave action. The other reason is the misplacement of the individual soundings between the positions, owing to the irregular speed of the steam-launch which is almost impossible to control as the boiler holds only about three gallons of water and, when going slow, the pump does not work regularly so that the steam-pressure is continually changing. This is the first hydrographic work executed in a steam-launch that I have ever plotted and the variation in distances between positions taken at equal time-intervals, and where there is little or no current to account for it, convinces me that it would be expedient to employ some mechanical means, such as the sounding of a bell at the end of a certain number of revolutions of the engine, to notify the leadsman when to sound, rather than time-intervals, at least in launches having Herreshoff, or similar, boilers.

The bottom in the channel across the Northern end of the Middle ground inside the entrance seems to be deposed in lumps rather than a continuous ridge.

The pilots informed me that it consisted of a ridge of sand so narrow as to be difficult to find with the lead and so soft that a steamer could easily push through it by going at good speed. Several years ago the U. S. Engineers dredged a channel across it but it did not remain open very long. To ascertain its exact condition I caused a number of lines in addition to the regular scheme to be run at slack water in the direction of the shoal and so close together that it was impracticable to plot but a small number of the soundings obtained. Of these, all the shoal soundings at least have been put down and made room for by removing deeper soundings already occupying the space. Even with this treatment the results show that it is not at present a continuous ridge but a series of lumps so disposed as to make it difficult to pick out a channel between them. Perhaps the construction of the wharf at the U. S. Quarantine Station, although built of iron piles, has had a tendency to turn the ebb-current more in that direction, causing a scouring across the shoal. Pilots and others familiar with the channel have informed me that it certainly has washed out inside Beacon 2, abreast the Quarantine Station, in recent years so that launches and other small craft can pass inside the beacon when wishing to avoid the strong current. I am somewhat confirmed in above opinion by reason of the fact that at the time of the survey in 1878 another wharf

existed at La Playa and the channel across the Middle ground then had similar characteristics. This suggests the simple remedy of a wing-dam at La Playa to scour a channel across the shoal.

I beg to refer to the Description Report of the topographic sheet covering this area for an account of the determination of the signals used in this survey, and I respectfully call attention to the fact that the new signals are not plotted by DMs & DPs but by distances only for reasons set forth in the above report. I could not wait for the corrected data to be sent from the Office and proceeded with the plotting of the positions from data at hand. The shoreline inked on the projection when received remains there uncorrected, nor have the jetty and the wharf at the Quarantine Station been transferred from the topographic sheet as I wanted to use all the space I could for the soundings. The same is true as regards the wharves at San Diego. There were so many and such long names inked on the water area, which had to be scraped out before putting down soundings, that I did not dare to disturb the fibre of the paper still further by correcting the wharf lines. For this reason also the soundings taken at oars length from the wharves are not plotted.

For other information called for in Par. 209, Instructions for Hydrographic Parties, I beg to refer to the full notes obtained in 1897-98 by a Naval Officer

specially detailed to collect such data, a copy of whose report I found on board this ship (McArthur.) There have been no changes of any consequence since then so far as I know.

Respectfully submitted
Ferdinand Westdahl
Asst. C. & G. Survey
Chief of Party